DISTRIBUTION OF INTERNAL STATES OF CO AND OH FROM O(\textsuperscript{1}D) + C\textsubscript{6}H\textsubscript{6} AND C\textsubscript{6}D\textsubscript{6} DETERMINED WITH TIME-RESOLVED FOURIER-TRANSFORM SPECTROSCOPY

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Rotationally resolved infrared emission spectra of CO (1 \leq v \leq 6) in the spectral region 1800 – 2350 cm\textsuperscript{-1} and OH (1 \leq v \leq 3) in the region 2800 – 3700 cm\textsuperscript{-1} were recorded with a step-scan Fourier-transform spectrometer. CO shows a rotational distribution corresponding approximately to temperatures 1520 K for \( v = 1 \) and 860 K for \( v = 2 - 6 \), with an average rotational energy of \( 9 \pm 1 \text{ kJ mol}^{-1} \) at the earliest applicable period (2.5 – 7.5 \text{ ms}) upon photolysis. Extrapolation to time zero based on data in the range 2.5 – 27.5 \text{ ms} yields an average nascent rotational energy of \( 14 \pm 4 \text{ kJ mol}^{-1} \). Observed vibrational distribution of CO corresponds to a vibrational temperature of \( 5800 \pm 330 \text{ K} \) and an average vibrational energy of \( 33 \pm 3 \text{ kJ mol}^{-1} \). OH shows a rotational distribution corresponding to temperatures 550 K for the P1 branch (\( v = 1 - 3 \)) and 620 K for the P2 branch (\( v = 1 - 3 \)), with an average nascent rotational energy of \( 4 \pm 1 \text{ kJ mol}^{-1} \). The observed vibrational temperature of OH is 4830 \pm 230 K, corresponding to an average vibrational energy of \( 21 \pm 4 \text{ kJ mol}^{-1} \). The branching ratio of \([\text{CO}]/[\text{OH}]\) is 2.1 \pm 0.1 for O(\textsuperscript{1}D) + C\textsubscript{6}H\textsubscript{6} and no OD was observed from O(\textsuperscript{1}D) + C\textsubscript{6}D\textsubscript{6}. The significant deuterium isotope effect will be discussed.